

CONTRIBUTIONS  
OF THE  
TROPICAL RESEARCH STATION  
OF THE  
NEW YORK ZOOLOGICAL SOCIETY

By WILLIAM BEEBE.

From the date of the establishment of the Tropical Research Station in January, 1916, to September, 1921, there have been published ninety-three contributions. Of these, eighty-nine are scientific papers or magazine articles and four bound volumes. To correlate, in convenient form, these contributions with the more important facts set forth in them, I have prepared the following list:

1916

Contribution Number

1. ESTABLISHMENT OF THE TROPICAL RESEARCH STATION  
WILLIAM BEEBE  
Bull. Zool. Soc. XIX, No. 4, July, p. 1369  
Hints for the formation of a tropical station, and photographs of jungle and laboratory.
2. NOOSING A BUSHMASTER  
WILLIAM BEEBE  
Ibid, p. 1372  
Method of capturing an eight-foot venomous snake alive and unharmed. *Lachesis mutus* (Linné)
3. THE COCK-OF-THE-ROCK  
LEE S. CRANDALL  
Ibid, p. 1375  
Habits of the bird, wild and in captivity. *Rupicola rupicola* (Linné).
4. NESTLING HOATZINS AT HOME  
WILLIAM BEEBE  
Bull. Zool. Soc. XIX, No. 5, Sept., p. 1393  
Thorough account of the activities and psychology of hoatzin chicks, photographs of the chicks climbing and in the nest, adult on nest, nest and eggs, and general environment. *Opisthocomus hoazin* (P.L.S. Mull.)

## 5. PICTURES FROM THE TROPICAL RESEARCH STATION

WILLIAM BEEBE and PAUL G. HOWES

Ibid, p. 1400

Photographs of

House Bats, *Vampyrus* sp.,Beesa Monkey, *Pithecia pithecia* (Linné)Aracari Toucan, *Pteroglossus aracari atricollis* (P.L.S. Mull.)  
and Akawai Indian Benab.

## 6. WASPS AT THE TROPICAL RESEARCH STATION

PAUL G. HOWES

Ibid, p. 1412

Brief account of wasp life at the Station. Photographs of the  
insects and their nests.

## 7. NOTES ON THE PERAI

G. INNESS HARTLEY

Bull. Zool. Soc. XIX, No. 6, p. 1428

Description, habits and methods of capture, photographs of  
teeth and entire fish, *Serrasalmo niger* (Schomb.).

## 8. A JUNGLE-BOUND RESEARCH STATION

WILLIAM BEEBE and PAUL G. HOWES

New York Tribune, Photogravure Section, December 24th, p. 3

Photographs of

Trumpeter Chicks, *Psophia crepitans* LinnéRhinoceros Beetle Grub, *Megasoma actaeon* LinnéHouse Bats, *Hemiderma p. perspicillatum* (Linné)Beesa Monkey, *Pithecia pithecia* (Linné)Young Aracari Toucan, *Pteroglossus aracari atricollis*  
(P.L.S. Mull.)Young Hoatzins, *Opisthocomus hoazin* (P.L.S. Mull.)Peraí, *Serrasalmo niger* (Schomb.)Giant Tree Frog, *Hyla maxima* (Laur.).

## 9. ANNUAL REPORT TO THE ZOOLOGICAL SOCIETY

Annual Report, New York Zool. Soc., 1916, p. 113

Résumé of first season's work at the Station, with personal  
contributions; photographs of laboratory.

## 1917

## 10. THE ALLIGATORS OF GEORGETOWN

WILLIAM BEEBE

Bull. Zool. Soc. XX, No. 1, p. 1437

Life history, breeding habits, method of capture, variation of  
young, photographs, drawings of young, *Caiman sclerops*  
(Schneid.).

## 11. INTERESTING BIRD'S NESTS FROM SOUTH AMERICA

WILLIAM BEEBE and PAUL G. HOWES

Ibid., p. 1458

Folio of photographs of Bird's Nests from the Station.  
Cayenne Hermit Hummingbird, *Phoebastria superciliosus superciliosus* Linné

Guiana Pygmy Flycatcher, *Tyranniscus acer* (Salv. and God.)

Oily Flycatcher, *Pipramorpha olcaginea olcaginea* (Licht.).

## 12. THE POMEROON TRAIL

WILLIAM BEEBE

Atlantic Monthly, January

Note on distribution of opossums, reptiles, insects and seeds by floating logs and currents; account of a road newly built from the sea through a tropical jungle; bird life of rice-fields.

## 13. A NATURALIST'S TROPICAL LABORATORY

THEODORE ROOSEVELT

Scribner's, January, p. 46.

Detailed account of the founding, the operation and the environment of the Research Station, and of jungle life as observed on walks. Photographs of jungle, Indian huts, bats, *Phyllostomus h. hastatus* (Pallas), Nestling Parrots, *Pionus fuscus* (P.L.S. Mull.), and Mouse Opossum, *Marmosa murina murina* (Linné).

## 14. TROPICAL WILD LIFE IN BRITISH GUIANA

WILLIAM BEEBE, G. INNESS HARTLEY and PAUL G. HOWES, with introduction by THEODORE ROOSEVELT

Published by New York Zool. Soc.

General and detailed account of the first year's work of the Station. 143 photographs by William Beebe and Paul G. Howes. This volume contains contributions 15 to 50, which are reviewed under their respective numbers.

## 15. INTRODUCTION TO TROPICAL WILD LIFE IN BRITISH GUIANA

THEODORE ROOSEVELT

Introduction, p. ix.

Character of the work accomplished at a static research station in the tropics.

## 16. ESTABLISHMENT OF THE TROPICAL RESEARCH STATION

WILLIAM BEEBE

Chap. I, p. 23

Detailed account of the conception and establishment of the Research Station at Kalacoon, on the Mazaruni River, British Guiana. Map and photographs of the Station.

## 17. HISTORICAL BARTICA

WILLIAM BEEBE

Chap. II, p. 31

History of three hundred years of occupation by the Spanish and Dutch.

## 18. THE NATURALISTS OF BARTICA DISTRICT

WILLIAM BEEBE

Chap. III, p. 38

Brief account of the work of Schomburgk, Hilhouse, Appun, Lloyd, imThurn, Whitely and McConnell.

## 19. THE GENERAL FIELD OF WORK

WILLIAM BEEBE

Chap. IV, p. 43

General surroundings and geology; map and photographs of the country.

## 20. THE OPEN CLEARING AND SECOND-GROWTH

WILLIAM BEEBE

Chap. V, p. 51

Succession of plant communities consequent upon clearing primitive jungle and a subsequent four years' second growth. Birds inhabiting the various areas.

## 21. THE JUNGLE AND ITS LIFE

WILLIAM BEEBE

Chap. VI, p. 69

Temperature and lack of dangers in jungle; seasons; vertical life zones of the jungle, with detailed distribution of birds and mammals.

## 22. THE BIRD LIFE OF BARTICA DISTRICT

WILLIAM BEEBE

Chap. VII, p. 91

Comparison of temperate with tropical avifauna; daily and seasonal migrations; roosting habits; northern migrants; classification of birds as to sociability, voice, coloration, food, friends, enemies; relations to the Indians; legal protection of wild birds in British Guiana; collecting for the Zoological Park.

## 23. LIST OF THE BIRDS OF BARTICA DISTRICT

WILLIAM BEEBE

Chap. VIII, p. 127

Classified list of 350 species of birds. By a proof-reading error on the part of one of the authors, the 22 starred species were made to read as new to the Colony of British Guiana, instead

of new to Brabourne and Chubb's List of the Birds of South America, the error being more absurd because some are among the most abundant species. This slip was deservedly corrected in a detailed article by Thomas E. Penard, (*Auk*, Vol. 36, No. 2, p. 217.)

24. AKAWAI INDIAN AND COLONIAL NAMES OF BIRDS AND MAMMALS

WILLIAM BEEBE

Chap. IX, p. 138

Akawai names of 143 species of birds and 41 species of mammals, taken orally, and after reconfirmation, transcribed.

25. METHODS OF RESEARCH

WILLIAM BEEBE

Chap. X, p. 147

Methods of shooting, trapping, or otherwise collecting and observing tropical organisms.

26. FURTHER NOTES ON THE LIFE HISTORY OF HOATZINS

WILLIAM BEEBE

Chap. XI, p. 155

Life History Notes of the Hoatzin, *Opisthocomus hoazin* (P.L.S. Mull.), in addition to those presented in "Ecology of the Hoatzin," *Zoologica*, Vol. I, No. 2, 1909, pp. 45-66. Photographs of environment, birds, nests and eggs.

27. THE HOMES OF TOUCANS

WILLIAM BEEBE

Chap. XII, p. 183

Detailed account of discovery of breeding habits of five species of Toucans, Red-billed Toucan, *Ramphastos monilis* Muller, Sulphur-and-white-breasted Toucan, *Ramphastos vitellinus* Licht., Black-necked Aracari, *Pteroglossus aracari atricollis* (P.L.S. Mull.), Green Aracari, *Pteroglossus viridis* (Linné), and the Guiana Toucanet, *Selenidera culik* (Wagler). Record and description of eggs of *Ramphastos monilis*, and of young *Pteroglossus aracari atricollis*. Photographs of nesting sites, eggs, young; diagrams of heel-pads of Black-necked Aracari.

28. ORNITHOLOGICAL DISCOVERIES

WILLIAM BEEBE

Chap. XIII, p. 213

Detailed description of nests and eggs of seventeen species of tropical birds which "have not heretofore been described, or are almost unknown." (For critical discussion of this paper, see Thomas E. Penard, *Auk*, Vol. 36, No. 2, p. 221).

Talpacoti Ground Dove *Chaemepelia talpacoti* (Temm. and Knip.), Red Mountain Dove *Oreopelia montana* (Linné), White-necked Crake, *Porzana albicollis* (Vieill.), Cayenne Crake, *Creciscus viridis viridis* (P.L.S. Mull.), Dusky Night-hawk, *Caprimulgus nigrescens* Cab., Guiana Tyrantlet, *Tyranniscus acer* (Salv. and God.), Oily Flycatcher, *Pipra-morpha oleaginea oleaginea* (Licht.), Varied Flycatcher, *Empidonomus varius varius* (Vieill.), Cinereous Bushbird, *Thamnomanes glaucus* Cab., Rufus-fronted Antcatcher, *Anoplops rufigula rufigula* (Bodd.), Quadrille Bird, *Leucolepia musica musica* (Bodd.), Orange-headed Manakin, *Pipra aureola aureola* (Linné), Brown-breasted Pygmy Grosbeak, *Oryzoborus angolensis brevirostris* (Berlepsch), Chestnut-bellied Seedeater, *Sporophila castaneiventris* Cab., Black-headed Seedeater, *Sporophila bouvronides* (Less.), Blue Honey Creeper, *Cyanerpes cyaneus cyaneus* (Linné), and the Moriche Oriole, *Icterus chrysoccephalus* (Linné). Photographs of nests.

## 29. YOUNG GREY-BACKED TRUMPETERS

WILLIAM BEEBE

Chapter XIV, p. 247

Detailed description of appearance, molt and habits of young Trumpeter, *Psophia crepitans* Linné, with photographs and colored plate.

## 30. THE WAYS OF TINAMOU

WILLIAM BEEBE

Chap. XV, p. 253

Life histories, nests, eggs and general account of Guiana Great Tinamou, *Tinamus major major* (Gmel.), Pileated Tinamou, *Crypturus soui soui* (Hermann), and the Variegated Tinamou, *Crypturus variegatus variegatus* (Gmel.), with photographs.

## 31. WILD LIFE NEAR KALACOOON

WILLIAM BEEBE

Chap. XVI, p. 271

Detailed account of awakening of tropical wild life from 5.30 to 6.45 A.M., on mornings of March 26, May 16 and July 2nd, 1916. Log of occurrences, broods, migrations and nesting seasons of tropical organisms, from June 15th to August 16th.

## 32. THE ALLIGATORS OF GEORGETOWN

WILLIAM BEEBE

Chap. XVII, p. 283

Detailed account of life history, breeding habits, eggs, young, variation in young, photographs and diagrams of young. *Caiman sclerops* (Schneid.).



## 33. NOTES ON THE DEVELOPMENT OF THE JACANA

G. INNESS HARTLEY

Chap. XVIII, p. 293

General development, pterylosis, head of embryo, toes and claws, spurs, relationships of growing leg and wing to body. With diagrams of wing growth, of legs and wings compared to body and of ontogenetic variations. Photograph of spurs. *Jacana jacana jacana* (Linné).

## 34. NOTES ON THE DEVELOPMENT OF THE SMOOTH-BILLED ANI

G. INNESS HARTLEY

Chap. XIX, p. 307

Detailed description of pterylosis of embryo and adult, wing pads, development of wing, bones of leg, and development of bill. With diagrams, charts, and photograph of embryo. *Crotophaga ani* (Gmel.).

## 35. NOTES ON A FEW EMBRYOS

G. INNESS HARTLEY

Chap. XX, p. 321

Pterylosis and external characters of embryos of *Caprimulgus nigrescens* Cab., *Pitangus sulphuratus sulphuratus* (Linné), and *Empidonomus varius varius* (Vieill.).

## 36. NESTING HABITS OF THE GREY-BREADED MARTIN

G. INNESS HARTLEY

Chap. XXI, p. 328

Breeding season, courtship, nest-building, eggs, young, food, development of flight, and instincts of young birds. Photograph of young. *Progne chalybea chalybea* (Gmel.).

## 37. PRELIMINARY NOTES ON THE DEVELOPMENT OF THE WING

G. INNESS HARTLEY

Chap. XXII, p. 342

Development of the wing and pinion in relation to habits of *Opisthocomus hoazin* (P. L. S. Mull.), *Psittacula passerina* (Linné), *Psophia crepitans* Linné, *Butorides striata* (Linné), *Pteroglossus aracari atricollis* (P.L.S. Mull.), *Galeoscoptes carolinensis* (Linné), *Cacicus cela cela* (Linné), *Pitangus sulphuratus sulphuratus* (Linné), and *Progne chalybea chalybea* (Gmel.). Development of the pinion of the following species: *Opisthocomus hoazin* (P. L. S. Mull.), *Psophia crepitans* Linné, *Pitangus sulphuratus sulphuratus* (Linné), *Pteroglossus aracari atricollis* (P. L. S. Mull.), *Galeoscoptes carolinensis* (Linné), *Progne chalybea chalybea* (Gmel.).

## 38. NOTES ON THE PERAI FISH

G. INNESS HARTLEY

Chap. XXIII, p. 342

A general account of this dangerous fish elaborated from contribution number 7.

## 39. THE BEES AND WASPS OF BARTICA

PAUL G. HOWES

Chap. XXIV, p. 371

General account, relation of rainfall to nesting, difficulties in rearing larvae.

## 40. TWO POTTER WASPS

PAUL G. HOWES

Chap. XXV, p. 376

General account, nests, food of young, egg, larva, cocoon, pupation. Red Potter Wasp *Eumenes canaliculata*, and Buff Eumenes, *Eumenes*, sp. Colored plates of egg, larva, pupa and imago. Photographs of wasp on nest, nests, and of larva within the nests.

## 41. LARVAL SACRIFICE

PAUL G. HOWES

Chap. XXVI, p. 386

Life history, nest, eggs, discussion of transformation from larva to pupa and imago. Colored plate of egg, larva, pupa and imago, Figure 125—9, 10, 11 and 12. Photographs of pupa, and of transformation from larva to pupa. *Podium rufipes* (Fabr.).

## 42. THE BLACK REED WASP

PAUL G. HOWES

Chap. XXVII, p. 394

Nests, nesting, nest provisions, egg, larva, pupa, method of depositing eggs in chambers of nest. Colored plate of egg, larva, pupa and imago, Figure 125—13, 14, 15 and 16. Photographs of nests. *Trypoxylon cinereohirtum* Cam.

## 43. THE WHITE-FOOTED WASP

PAUL G. HOWES

Chap. XXVIII, p. 401

General account, method of laying eggs, larval food, nests, eggs, larva, cocoon, pupa, emergence. Colored plate of egg, larva, pupa and imago, Figure 133—1, 2, 3 and 4. Photograph of cocoon. *Trypoxylon leucotrichium* Rohmer.



## 44. THE FOREST SHELL WASP

PAUL G. HOWES

Chap. XXIX, p. 407

General account, nests, egg, larval food, larva, artificial feeding of larva, pupation, emergence. Colored plate of egg, larva, pupa and imago, Figure 133—5, 6, 7 and 8. Photographs of nests and larvae. *Zethuscus hamatus* Zav.

## 45. THE ONE-BANDED DAUBER

PAUL G. HOWES

Chap. XXX, p. 413

General account, methods of constructing nests, discussion of sense of direction, larval food, egg, larva, pupa, cocoon. Colored plate, Figure 133—9, 10, 11 and 12. Photographs of nest, wasp at nest and newly emerged specimen. *Sceliphron fistulare* Dahlb.

## 46. THE BLUE HUNTRESS

PAUL G. HOWES

Chap. XXXI, p. 413

General account, nest, larval food, egg, larvae, pupa, emergence from cocoon. Colored plate, egg, larva, pupa and imago, Figure 133—13, 14, 15 and 16. Photographs of wasp at nest, cocoon. *Chlorion neotropicus* Kohl.

## 47. PARALYZED PROVENDER

PAUL G. HOWES

Chap. XXXII, p. 436

General account of the actions of wasps in paralyzing spiders and insects. Forms of paralysis produced by wasps.

## 48. CONTROLLED PUPATION

PAUL G. HOWES

Chap. XXXIII, p. 443

General account of larva of Trypetid flies of genus *Spilograpta*. Transformation of larva to pupa. Photographs of larva.

## 49. NOTES FROM THE HINTERLAND OF GUIANA

WALTER G. WHITE

Chap. XXXIV, p. 453

General account of the country and the animals found along the upper Rupununni River.

## 50. INDIAN CHARMS

JAMES RODWAY

Chap. XXXV, p. 488

Charms and superstitions of the Guiana Indians, with colored plate of plant leaves used as charms.

## 51. A HUNT FOR HOATZINS

WILLIAM BEEBE

Atlantic Monthly, February.

Detailed account of the general environment of hoatzins.  
*Opisthocomus hoazin* (P. L. S. Mull.).

## 52. WITH ARMY ANTS SOMEWHERE IN THE JUNGLE

WILLIAM BEEBE

Atlantic Monthly, April

Method of attack, securing and carrying food, and general account of the offensive activities of *Eciton burchelli* Westwood.

## 53. A WILDERNESS LABORATORY

WILLIAM BEEBE

Atlantic Monthly, May

Method of founding and operating a jungle laboratory with description of the environment, opportunities for research, servants, etc.

## 54. COLONEL ROOSEVELT AND THE TROPICAL RESEARCH STATION

WILLIAM BEEBE

Timehri (3), IV, June, p. 27

Brief narrative of the part which Colonel Roosevelt played in the conception and development of the Station.

## 55. JUNGLE NIGHT

WILLIAM BEEBE

Atlantic Monthly, July

Activities of organisms on moonlit nights in the Guiana jungle.

## 56. ANNUAL REPORT OF THE TROPICAL RESEARCH STATION

WILLIAM BEEBE

Annual Report of the New York Zool. Soc. 1917, p. 99

Activities of the Station staff during the year 1917.

## 1918

## 57. A SILKY EATER OF ANTS

WILLIAM BEEBE

Bull. Zool. Soc. XXI, No. 1, January, p. 1561

General account of the Silky Anteater, *Cyclopes didactylus didactylus* (Linné), with photographs and drawings.

## 58. LABEL-MAKING IN THE FIELD

WILLIAM BEEBE

Ibid., p. 1574

Short account of simple photographic method of making field labels of small size.

## 59. A SECOND IMPERIAL PARROT

WILLIAM BEEBE

Ibid., p. 1578

General account of the second specimen of this rare parrot brought to the Zoological Park, *Amazona imperialis* (Rich.).

## 60. INSECT TYRANTS

WILLIAM BEEBE

Bull. Zool. Soc. XXI, No. 5, p. 1670

General account of the methods of attack, and methods of transportation used by the army ant, *Eciton burchelli* Westwood. With two drawings.

## 61. ANTS COLLECTED IN BRITISH GUIANA BY MR. WILLIAM BEEBE

WILLIAM MORTON WHEELER

Jour. N. Y. Ento. Soc., Vol. XXVI, No. 1, March, p. 23

Account of a small collection of ants taken from twenty square feet of bushes at Penal Settlement, Bartica District. The collection comprises 42 forms and the following new species:

*Camponotus (Myrmobrachys) beebei* Wheeler.

*Crematogaster ornatipilis* Wheeler.

## 62. ISLANDS

WILLIAM BEEBE

Jour. Am. Mus. Nat. Hist., Vol. XVIII, No. 6, p. 453

Notes on the West Indies, from St. Thomas to Barbados.

## 63. CONVICT TRAIL

WILLIAM BEEBE

Atlantic Monthly, September

The cutting of a trail through second growth jungle and the subsequent effect on flora and fauna; social sleeping habits of Ithomiid and Heliconid butterflies.

## 64. SEA WRACK

WILLIAM BEEBE

Atlantic Monthly, October.

Study of the pelagic life and sargossa weed organisms between New York and British Guiana.

## 65. JUNGLE PEACE

WILLIAM BEEBE

8vo., New York, Henry Holt &amp; Co. Illustrated by the author.

Collection in book form of contributions 12, 51, 52, 53, 55, 62, 63 and 64.

## 66. BEES FROM BRITISH GUIANA

T. D. A. COCKERELL

Bull. Amer. Mus. Nat. Hist., Vol. XXXVIII, Art. XX, p. 685

Account of a small collection of bees from Bartica District, with key to all the forms in the collection, and descriptions of the following new species and varieties:

*Euglossa decorata* Smith, var. *ruficauda* Cockerell*Englossa ignita* Smith, var. *chlorosoma* Cockerell*Epicharis maculata* var. *barticana* Cockerell*Rhathymus beebei* Cockerell*Augochlora callichlorura* Cockerell*Florilegus barticanus* Cockerell

Included in this paper is a description of a new species from French Guiana in the author's collection:

*Augochlora maroniana* Cockerell.

## 67. ANNUAL REPORT OF THE TROPICAL RESEARCH STATION

WILLIAM BEEBE

Annual Report N. Y. Zool. Soc., 1918, p. 84

Activities of the Station during 1918.

## 1919

## 68. REVIEW OF "TROPICAL WILD LIFE IN BRITISH GUIANA"

GEORGE W. HUNTER

Bull. Zool. Soc., XXII, No. 1, p. 21

Critical and detailed review of the work of the Tropical Research Station as narrated in "Tropical Wild Life in British Guiana."

## 69. HAMMOCK NIGHTS

WILLIAM BEEBE

Atlantic Monthly, February

Night life of the jungle as observed from a hammock.

## 70. HIGHER VERTEBRATES OF BRITISH GUIANA, LIST OF AMPHIBIA, REPTILIA AND MAMMALIA

WILLIAM BEEBE

Zoologica, Vol. II, No. 7, p. 205

Check list of 52 amphibians, 112 reptiles and 119 mammals of British Guiana of which almost half occur at the Station.

(See in connection with this paper, "Comments on a Recent Check-list," by Thomas Barbour, American Naturalist, Vol. LIV, page 285.)

71. BIRDS OF BARTICA DISTRICT

WILLIAM BEEBE

Zoologica, Vol. II, No. 8, p. 229

Check list of 75 birds new to the Bartica District. This list is a supplement to the list found in Contribution 23.

72. LIZARDS OF THE GENUS *AMEIVA*

WILLIAM BEEBE

Zoologica, Vol. II, No. 9, p. 235

A brief, critical study of the pattern and color of *Ameiva* lizards, with a discussion of Barbour and Noble's paper, "A Revision of the Lizards of the Genus *Ameiva*," Bull. Mus. Comp. Zool., Harvard, LIX, No. 6, 1915, pp. 417-479.

73. THE TROPICAL RESEARCH STATION

WILLIAM BEEBE

Bull. Zool. Soc., XXII, No. 4, p. 274

Brief account of the re-establishment of the Tropical Research Station at its new home, Kartabo, with short account of some of the forms of life at the Station.

74. THE TERMITES OF KARTABO

ALFRED EMERSON

Ibid., p. 75

Notes on termite nests and general termite ecology.

75. A HOME TOWN OF THE ARMY ANTS

WILLIAM BEEBE

Atlantic Monthly, October

Detailed account of the temporary nest and the intricate nest activities of a colony of *Eciton burchelli* Westwood.

76. INSECT BEHAVIOR

PAUL G. HOWES

Richard G. Badger, Boston, Mass.

Chapters II to IX, inclusive, are reprints of contributions 41 to 48 from "Tropical Wild Life."

77. ANNUAL REPORT OF THE TROPICAL RESEARCH STATION

WILLIAM BEEBE

Annual Report, N. Y. Zool. Soc. 1919, p. 115.

Activities of the Station for the year 1919.

## 1920

## 78. A JUNGLE CLEARING

WILLIAM BEEBE

Atlantic Monthly, January

Comparison of superficial aspects of tropical with temperate fauna and flora; biocoenose of a weed, parakeets, cotingas and toucans.

## 79. THE LURE OF KARTABO

WILLIAM BEEBE

Atlantic Monthly, February

The founding of the Station at its permanent site, and description of the wild life in the immediate vicinity.

## 80. TROPICAL TADPOLES

JOHN TEE-VAN

Bull. Zool. Soc., Vol. XXIII, No. 1, Jan., p. 9

Brief account of tadpoles and tadpole habits at Kartabo.

## 81. FOURTH YEAR OF THE NEOTROPICAL RESEARCH STATION

HENRY FAIRFIELD OSBORN

Science, June 11, 1920, pages 585-587

Résumé of the foundation, objects and achievements of the Station.

## 82. ANNUAL REPORT OF THE TROPICAL RESEARCH STATION

WILLIAM BEEBE

Annual Report, N. Y. Zool. Soc. 1920, p. 111.

Activities of the Station during 1920.

## 1921

## 83. A TROPIC GARDEN

WILLIAM BEEBE

Atlantic Monthly, February

Habits of manatees, *Trichechus manatus* Linné, jacanas, *Jacana jacana jacana* (Linné), mongoose, *Mungos mungo* (Gmelin), and herons.

## 84. GUINEVERE THE MYSTERIOUS

WILLIAM BEEBE

Atlantic Monthly, March

*Phyllomedusa bicolor* (Bodd.), its environment, metamorphosis and habits.



## 85. A NEW CASE OF PARABIOSIS AND THE "ANT GARDENS" OF BRITISH GUIANA

WILLIAM MORTON WHEELER

Ecology, Vol. II, No. 2, April, 1921, p. 89

Résumé of the known cases of myrmicine parabiosis. Records of the parabiosis of *Camponotus* and *Crematogaster* in 80 per cent of the ant gardens found near the Station; detailed account of these gardens.

## 86. THE BAY OF BUTTERFLIES

WILLIAM BEEBE

Harpers Magazine, April

Habits of the Giant Singing Catfish, *Doras granulosus* Valenciennes; the Long-armed Beetle, *Acrocinus longimanus* (Linné), and general life of the tidal area of the Mazaruni shore; migration and social habits of five species of *Catopsilia*.

## 87. A JUNGLE BEACH

WILLIAM BEEBE

Atlantic Monthly, May

The ecological results, floral and faunal, of the falling of a single tree into the water; organisms living in the tide-washed roots of trees.

## 88. OBSERVATIONS ON ARMY ANTS IN BRITISH GUIANA

WILLIAM MORTON WHEELER

Proc. Am. Acad. Arts and Sci., Vol. 56, No. 8, June 1921, p. 291

Notes on the life histories of twelve species of army-ants, three of which are new to science; description of the female of *Eciton burchelli* Westwood, and the males of that species and of *Eciton pilosum* F. Smith. Descriptions of the following new species and varieties: *Eciton (Acamatus) angustinode* Emery subsp. *emersoni* Wheeler, *Eciton (Labidus) praedator* F. Smith var. *guianense* Wheeler, *Eciton (Acamatus) pilosum* F. Smith var. *beebei* Wheeler, and *Cheliomyrmex megalenyx* Wheeler. With many photographs and drawings.

## 89. THE GARDENS OF THE JUNGLE

WILLIAM BEEBE

House and Garden Magazine, July

An account of the plants raised by the Akawai Indians of Guiana.

## 90. THE ATTAS—A JUNGLE LABOR UNION

WILLIAM BEEBE

Atlantic Monthly, July

*Atta cephalotes* Fab. Foundation of the nest by the queen, leaf cutting activities, the trails, functions of the minors in the field, and abnormal actions of the majors.

## 91. THE ATTAS AT HOME

WILLIAM BEEBE

*Atta cephalotes* Fab. The nest, its appearance, environment, visitors, parasitic and otherwise, reactions in defense, fungus gardens, habits of the parasitic cockroach *Attaphila*, marriage flight of the males and females, founding of a new colony.

## 92. SEQUELS

WILLIAM BEEBE

Atlantic Monthly, October

Instrumental sounds made by Tapping Wasp, *Synoecca irina* Spinola; voice of *Trogonurus curucui curucui* (Linné); remarkable exhibition of instinct by *Eciton burckhelli* Westwood, an entire colony being confined to a one-hundred yard circle for several days.

## 93. EDGE OF THE JUNGLE

WILLIAM BEEBE

8vo. Henry Holt &amp; Co., New York, October

Collection in book form of contributions Nos. 69, 75, 78, 79, 83, 84, 86, 87, 89, 90, 91, 92.

## APPENDIX

Before the establishment of the Tropical Research Station there were published in the first and second volumes of ZOOLOGICA a number of articles by William Beebe, then Curator of Birds, dealing with Neotropical zoology. In order to correlate all the past work of the Society in this direction a list of titles is presented:

## A CONTRIBUTION TO THE ECOLOGY OF THE ADULT HOATZIN

WILLIAM BEEBE

Zoologica, I, No. 2, 1909, p. 45

History, names, distribution, general appearance, parasites, food, nests, eggs, enemies and odors. Field notes on this species made in British Guiana and Venezuela. Methods of photographing. Bibliography, map of distribution and photographs of the adults in their natural surroundings. *Opisthocomus hoazin* (P. L. S. Mull.).

## AN ORNITHOLOGICAL RECONNAISSANCE OF NORTHEAST-ERN VENEZUELA

WILLIAM BEEBE

Zoologica, I, No. 3, 1909, p. 67

General character of the pure mangrove forest, the mainland forest and the pitch lakes. Annotated list of the birds observed, and ecological conclusions concerning the birds of the Orinoco region. Notes on the voice of many species of birds. Descriptions of the nests and eggs of the following species: Great Blue Tinamou, *Tinamus tao* Temm., Venezuelan Rufous-tailed Jacamar, *Galbula ruficauda* Cuv., Yellow-backed Cassique, *Caccicus persicus* Linné, and the eggs and young of the Yellow-fronted Amazon Parrot, *Amazona ochrocephala* (Gmel.).

#### NEW SPECIES OF INSECTS COLLECTED BY C. WILLIAM BEEBE IN SOUTH AMERICA

Zoologica, I, No. 4, 1910, p. 118

Descriptions of the following new genera and species of insects collected by William Beebe in British Guiana and Venezuela:

##### MALLOPHAGA

*Colpocephalum armiferum* Kellogg—host *Opisthocomus hoazin* (P. L. S. Mull.); *Lipeurus absitus* Kellogg—same host. Described by Vernon L. Kellogg, Stanford University, California.

##### ORTHOPTERA

*Stagmomantis hoorie* Caudell. Described from male and female specimens from near the Hoorie gold mine on Hoorie Creek, a tributary of the Barama River, British Guiana, by A. N. Caudell, U. S. National Museum, Washington, D. C.

##### LEPIDOPTERA

The following new species and genera were described by Harrison G. Dyar, U. S. National Museum, Washington, D. C.: *Hylesia indurata*, *Zatrephes cardytera*, genus *Zaevius*, *Zaevius calocore*, genus *Thyonaea*, *Thyonaea dremma*, *Illice biota*, *Neophaenis aedemon*, *Emarginea empyra*, *Hadena niphelodes*, *Capnodes albicosta*, *Thermesia dorsilinea*, *Claphe laudissima*, *Rifarugia phanero stigma*, *Eois costalis*, the female of *Racheolopha nivetacta*, *Acropteryx opulenta*, *Saccopleura lycealis*, genus *Dichocrocopsis*, *Dichocrocopsis maculiferalis*, *Ischnurges bicoloralis*, genus *Hositea*, *Hositea gynaeccia*, genus *Incarcha*, *Incarcha aporalis*, *Macalla pallidomedia*, *Paracraga amianta*, *Minacragides arnaxis*, *Trosia nigripes*, and *Hemipecten cleptes*. All of the above insects are described from specimens captured at Hoorie, British Guiana.

#### RACKET FORMATION IN TAIL FEATHERS OF THE MOTMOTS

WILLIAM BEEBE

Zoologica I, No. 5, 1910, p. 141

Methods and means of denudation of the barbs of the central rectrices of the Motmots, *Momotus*, *Eumomotus* sp., to form the characteristic racket.

NOTES ON THE ONTOGENY OF THE WHITE IBIS, *GUIRA ALBA*

WILLIAM BEEBE

Zoologica I, No. 12, 1914, p. 241

Breeding habits, eggs, young, food of young, development and annual changes in coloration and form of the White Ibis, *Guira alba* (Linné). With a colored plate.

## SPECIALIZATION OF TAIL DOWN IN CERTAIN DUCKS

WILLIAM BEEBE and LEE S. CRANDALL

Zoologica I, 13, 1914, p. 247

Account of retention of the caudal down by attachment to the growing juvenile rectrices in *Aix sponsa* Linné, *Erismatura jamaicensis* (Gmel.), and *Merganetta columbiana* Des Murs.

## NOTES ON THE BIRDS OF PARÁ, BRAZIL

WILLIAM BEEBE

Zoologica II, No. 3, 1916, p. 55

Account of a visit to Pará, Brazil, with discussion of the region, the general ecology, and of the visit of seventy-six species of birds to a single tree. Notes on some of the invertebrates of the region. Notes on the molt of some Pará birds. Annotated list of the birds observed.

## FAUNA OF FOUR SQUARE FEET OF JUNGLE

WILLIAM BEEBE

Zoologica, II, No. 4, 1916, p. 107

An investigation of four square feet of debris taken from the jungle floor near Pará, Brazil, and carefully searched for minute forms of life. Accounts of the many interesting invertebrates found within the debris. Illustrations of the following new ants, *Glomyromyrmex beebei* Wheeler, and *Blepharidatta brasiliensis* Wheeler.

Also belonging to this series is the following volume, dealing with the account of a trip into the British Guiana jungle in the year 1909.

## OUR SEARCH FOR A WILDERNESS

M. B. &amp; C. W. BEEBE

8vo., 408 pages, illustrated. Henry Holt & Co., New York, 1910  
Pages 111 to 398 deal entirely with British Guiana and the animal life found there.